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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/558,935 | 12/01/2005 | Satoshi Furuta | 4700.P0320US | 6397 |
| 23474 7590 02/07/2007 FLYNN THIEL BOUTELL & TANIS, P.C. 2026 RAMBLING ROAD KALAMAZOO, MI 49008-1631 | | | EXAMINER KATAKAM, SUDHAKAR | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1621 | |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 02/07/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/558,935

Applicant(s)

FURUTA, SATOSHI

Examiner

Sudhakar Katakam

Art Unit

1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12/01/05, 01/16/07.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The examiner has considered applicant's Information Disclosure Statements of 12/01/05, and 01/16/07. Please refer to the signed copies of the PTO-1449 forms attached herewith.

Specification

2. The first sentence of the specification should be corrected to reflect the fact that the instant case is a national stage application of PCT/JP04/09250 filed under 35 USC 371.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by **Kumar et al** (Synlett, 251-253, 2, 2000).

The instant claims are drawn to a method for the manufacture of an ester by trans-esterification, in which an ester and an alcohol are brought into contact with a catalyst comprising zirconium oxide and an oxide of group III element, an oxide of group V element, and/or an oxide of group IV element other than zirconium and hafnium.

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Kumar et al disclose a facile and selective procedure for trans-esterification of beta keto esters with alcohols in presence of yttria-zirconia based Lewis acid catalyst [see abstract].

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Bayenes et al** (US 5,508,457), **Putzig** (US 6,166,170), and **Putzig et al** (6,255,441).

The instant claims are further limited by using starting material ester is an oil or fat, and an acid catalyst contains zirconium oxide and an oxide of group III element, an oxide of group V element, and/or an oxide of group IV element other than zirconium and hafnium.

Bayenes et al teach a process for the transesterification of carboxylic acid esters in presence of a catalyst consists of silicates and zirconium [col.7, lines 36-45]. Specifically triglycerides are transesterified with alkanol [col. 8, lines 22-23]. Catalyst contains 1 to 60% of group IV B element, calculated as metal [col. 7, lines 26-28].

The difference between the instant invention and **Bayenes et al** is that in the instant invention also uses oxides of zirconium, titanium, group III and V elements, whereas **Bayenes et al** teaches the use of silicates of the group IV B elements for the transesterification process.

With regard to the titanium, **Putzig** teaches a catalyst composition, which can be used as a transesterification catalyst using titanium compound combined with a zirconium compound [see Abstract]. The molar ratio of Ti/Zr can be in the range of from about 0.001:1 to about 10:1 [col. 3, lines 18-19].

With regard to the group III and V elements, **Putzig et al** teach a catalyst composition, which can be used as an transesterification catalyst [col. 1, lines 64-65]. The catalyst composition comprising ortho zirconates, phosphonic acid, and a cocatalyst selected from aluminum, antimony compound and combinations thereof.

The major advantage of the mixed transition metal solid catalysts is that they catalyze transesterification reactions in a heterogeneous catalysis process, i.e., the solid catalyst used in not consumed in the reaction and thus easy to separate and recover it from the reaction medium, and moreover it does not pollute the reaction medium.

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Please note it is known in the art that the combination of the oxides of the elements of group III to VIII is used as a catalyst in transesterification reactions.

Bayenes et al teach mixed transition metal acid catalyst of zirconium and silicates for the transesterification of triglycerides are transesterified with alkanol, which reads on claim 3 and 5. **Putzig** teaches mixed transition metal acid catalyst of zirconium and titanium, which reads on claim 4. **Putzig et al** teach mixed transition metal acid catalyst of zirconium with other group elements, viz., group III, and V, which read on claims 6, 8-9 of the instant application. The temperature range and the composition of metals in the catalyst are overlap with the scope of reference teachings.

Therefore, in view of explicit teachings of **Bayenes et al**, **Putzig**, and **Putzig et al** and the advantages of mixed transition metal solid catalysts in the transesterification reactions, the examiner purports that it would have been obvious to a person of ordinary skill in the art, at the time of invention was made, to use solid acid catalysts taught by references, in order to make the reaction process more cost effective and to achieve good yields, with a reasonable expectation of success.

Some limitations of the dependent claims may not be expressly disclosed in **Bayenes et al**, **Putzig**, and **Putzig et al**. However, these limitations appear to be drawn to tweaking the process conditions, particularly reaction temperature range, and wt.% ratios of metals. Changing such parameters is prima facie obvious because an ordinary artisan would be motivated to optimize a process. Merely modifying the process conditions such as temperature and concentration is not a patentable

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modification absent a showing of criticality. In re Aller, 220 F.2d 454, 105 U.S.P.Q. 233 (C.C.P.A. 1955).

Conclusion

8. No claim is allowed.
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhakar Katakam whose telephone number is 571-272-9929. The examiner can normally be reached on M-F 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thurman Page can be reached on 571-272-0602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SK

**J. PARSA
PRIMARY EXAMINER**

